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ABSTRACT

To compare the effect of remedial reading instruction over time on reading error patterns of at risk readers further classified as "learning disabled" (LD) with non-LD failing readers, a study examined 60 randomly selected children from a population of low achieving first graders in urban, suburban, and rural elementary schools throughout Ohio. Thirty at-risk readers were randomly selected from a total population of 110 least able children who were further classified as LD by local teams of reading professionals. Both LD and non-LD students participated in the Reading Recovery program, which employs holistic reading and writing tasks to help children develop effective reading strategies. Data was collected from oral reading records (running records) from entry to exit during the 1986-1987 Reading Recovery program for each subject. Results indicated that the nature of beginning reading instruction appears to influence reading behaviors of the LD readers. Both LD and non-LD groups became more alike as they progressed through the Reading Recovery program, and no significant differences existed between the oral reading error patterns of the two groups at the time of exit. (Three tables of data are included, and 17 references are appended.) (MM)

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The Effect of Instruction on the Oral Reading Behaviors of Children Classified as Learning Disabled

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The Effect of Instruction on the Oral Reading Behaviors of Children Classified as Learning Disabled

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The body of research in reading must ultimately address two questions: What processes do children use when learning to read? How does instruction influence the process of learning to read? We need to know about the beginning of reading and about how beginning readers refine and expand to become mature readers. These questions are especially critical when applied to youngsters who have difficulty learning to read, so much that they bear the various labels we now use to identify special disabilities.

For the past sixty years, reading researchers have been interested in the type of errors first grade children make when learning to read (Gates, 1927; Agnew, 1939; Goodman, 1969; Biemiller, 1970). Errors, sometimes called "miscues," have been analyzed in search of evidence about how children process information while reading. Several studies of error behavior (Elder, 1971 and Barr, 1974) showed that the nature of instruction appears to influence the strategies that first grade children form when learning to read.

Researchers have shown that when the materials and methods are organized around the letter and word units of print, children tend to rely on graphic information and try to sound the words out, sometimes making word substitutions that do not make sense (Elder, 1971; Barr, 1974). Beginning readers who are taught using a sight-word approach are typically more observant of contextual constraints (Biemiller, 1970), and tend not

to make nonsense word responses; nevertheless, they are constrained by the set of previously taught sight words. Empirical research has not documented how beginning readers refine and expand the dominant teaching approach they were taught into mature strategies that involve integrating structural, visual and meaning cueing systems. Regardless of the type of initial reading program used, the majority of first grade children learn to treat print as a representation of natural language by the end of first grade.

Generally speaking most first graders are able to coordinate their use of graphic and contextual information because the first grade reading programs are eclectic and therefore composed of elements drawn from various reading theories and doctrines. However, reading programs for children who have experienced difficulty in learning to read after one year of instruction are not eclectic and tend to focus on bits and pieces of print, teaching letters, sounds, and words in isolation. For the least able youngsters, often labeled "learning disabled," leading practicitioners and researchers usually recommend a code-emphasis approach in beginning reading instruction (Lewis, 1983). Instructional practices in the teaching of reading to mildly handicapped (Jenkins, Stein, & Osborn, 1981) and learning disabled youngsters (Lewis, 1983) have traditionally reflected an emphasis on decoding. It is reasonable to speculate that since children identified as learning disabled are likely to be placed in beginning reading programs that focus on decoding, the effect of this type of beginning reading instruction should be evident in their oral reading behavior.

Recent research (Lyons, 1987) comparing "at risk" readers who were further classified as "learning disabled" with other least able first

grade readers support this speculation. Low readers classified by an interdisciplinary team of professionals prior to the study as "learning disabled" differed from other failing readers in what they initially attended to during the first few weeks of instruction (Lyons, 1987). The "LD" group tended to sound out every unknown word, over attending to visual information compared to the not "LD" group who tended to rely on meaning and structure of the language to derive meaning from print. An analysis of the error behaviors at the end of the program however, revealed little difference between the "LD" and not "LD" children. Both groups consistently used meaning, structural and visual information in an integrated way to derive meaning from text. Furthermore, all the youngsters were discontinued from the program reading at average levels in their respective first grade classrooms.

Results from this study supported Barr's (1974) findings. How first grade children attempt to read is influenced to a significant degree by the class instructional method. The evidence further suggested that when instruction is tailored to meet individual learning strengths and needs it is very effective, even for children classified as "learning disabled." Teachers must be trained, however, to observe, describe, analyze, and record a childs' reading behaviors if they are to effectively design and implement an instructional program which will enable a failing child to read independently with the average of the class. This specialized training is an integral part of the Reading Recovery program.

Reading Recovery, developed by New Zealand educator and psychologist Dr. Marie M. Clay, provides a trained teacher with a proven way to improve reading skills. The intervention program targets the least able readers in the first grade class. In addition to their regular classroom

activities, children are provided one-to-one planned lessons for 30 minutes each day by a specially trained teacher. Each lesson includes reading many "little" books and composing and writing a message or brief story. During these holistic reading and writing tasks, teachers use special techniques to help children develop the effective strategies that good readers use.

To implement Reading Recovery, teachers need special training over the period of one year. As teachers receive training, they simultaneously implement the program with children. Through clinical and peer-critiquing experiences guided by a skilled leader, teachers learn to use diagnostic techniques and strategies for conducting lessons. Extensive use is made of a one-way glass for demonstration and observation. Teachers become sensitive observers of children's reading and writing behavior and develop skill in making moment to moment diagnosis to inform instruction.

Results of the program in New Zealand (Clay, 1979, 1985) and Ohio (Pinnell, Short, Lyons, & Young, 1986) showed that children "at risk" of failure made accelerated progress while receiving the individual tutoring. Results from the Ohio Reading Recovery program, Pinnell et al. (1986), revealed that 73% of the least able first grade children reached average levels in reading and were discontinued from the program. Two year follow-up studies (DeFord, Pinnell, Lyons, & Young, 1986) revealed that children who were discontinued from the Reading Recovery program continued to maintain their gains and were reading the adopted basal reading system materials at the rate specified by the publishers for children reading on grade level. Lyons (1987) reported 82% of the "at risk" first grade readers who are further classified as "learning disabled" were discontinued from the Reading Recovery program.

The pilot study (Lyons, 1987) provided evidence that learned behaviors "LD" children acquire before entering the Reading Recovery program can be unlearned. Furthermore, children in Reading Recovery who moved from a "bits and pieces" focus to an integrated view appeared to out-grow their learning disability suggesting that the disability was the result of inappropriate instruction. Only when the Reading Recovery teacher insisted that the "LD" child attend to the meaning and structure of language did the child expand his view and see that reading involved the integration of meaning, language structure, and visual information in an effort to gain meaning (Lyons, 1988). The data suggested that the children in the pilot study were "ID", instructionally disabled, not "LD", learning disabled.

Lyons (1987) showed that 1) the instruction "LD" readers received prior to entering the Reading Recovery program influenced how they translated print to speech and 2) this process can be discerned by analyzing children's error patterns in the beginning of the program. This research, however, was limited in 2 ways.

First, the sample size was small, including 12 discontinued children who were randomly selected from the population of children classified as learning disabled (N=6) and not learning disabled (N=6); consequently we do not know if the same patterns of error behavior (overreliance on visual information) apply to a larger sample. The present study addresses this concern by utilizing a random sample of 60 failing first grade readers selected from each group: 30 further classified as learning disabled and 30 who were not classified as learning disabled.

Second, in the pilot study a case study method was used to explore how low achieving children, who are successful, change in reading

strategies during the period of special instruction. The pilot study utilized the error behavior and instructional program of one child classified as "learning disabled" who accelerated rapidly. This analysis provided insight into the potential effect of instruction on reading error patterns. Specifically, it was determined that the "learning disabled" child begins to "put it all together" integrating meaning, structural and visual information around text reading of books that are appropriate reading for the proficient first grade reader near the end of the school year (Lyons, 1987). We do not know, however, if the same shift in behavior (from over reliance on visual information to multiple cueing systems) occurs with a larger sample of "learning disabled" children around the same level of reading competence.

The purpose of this study was two-fold: 1) to discern whether similar error patterns of behavior occur with a larger sample of children; and 2) to compare the effect of instruction over time on reading error patterns of at risk readers further classified as "learning disabled" with not "learning disabled" failing readers.

Method

Subjects

The sixty children randomly selected for the study were from a population of low achieving first graders in urban, suburban, and rural elementary schools throughout the State of Ohio. All subjects experienced one year of instruction in kindergarten and none of the children had ever been retained. They all scored below the 36th percentile on the Metropolitan Reading Diagnostic Test (1986) and placed in the bottom 20% of their first grade class in reading on the Diagnostic Survey (Clay, 1985).

The 2 groups did not differ in chronological age. There were 20 boys and 10 girls in the "learning disabled" group and 15 boys and 15 girls in the "not learning disabled" group.

Thirty at risk readers were randomly selected from a total population of 110 least able children who were further classified as "learning disabled" by local teams of professionals prior to or during the first few months of first grade. Bases for classification included written referral by a teacher, administrator, reading specialist, and/or parents and a battery of tests which included Wide Range Achievement Test (WRAT) (Jastak & Jastak, 1965), the Boder Diagnostic Reading-Spelling Test (Boder, 1986) and formal reading tests. No formal intelligence tests were administered to the "learning disabled" group; however, it was generally agreed among the professional team that they could function within the normal range of intelligence.

To control for consistency in recording error behavior, teacher was held constant. Each Reading Recovery teacher works with approximately 10 children during an academic year. For every "learning disabled" child, another Reading Recovery child was randomly selected from the pool of other children tutored by the same teacher. These 30 children formed the not "learning disabled" group.

Data Collection

Data was collected from oral reading records (running records) from entry to exit during the 1986-1987 Reading Recovery instructional program for each of the 60 subjects. A random sample of two running records, with an accuracy rate between 85% to 95%, was selected for levels three through ten. This accuracy range was set because the text is sufficiently difficult enough for the child to demonstrate the reading strategies he

has learned: self monitoring, searching for cues, cross-checking one cueing system against another cueing system, self correcting. When the text is too difficult (below 85%) the processing breaks down; when the text is too easy (above 95%) the reading strategies described are not observable.

Text reading levels used in Reading Recovery range from one through twenty-six, representing basal series reading levels pre-primer through grade six. Levels one and two were eliminated from the data collection because 23 of the 60 children sampled began the program at level three. Recent research (Pinnell, Short, Lyons, Young, 1986) revealed that children reach proficient levels in reading around levels 8, 9, and 10. Therefore for purposes of this research study, the entry level criterion was set at levels 3, 4, and 5 and levels 8, 9, and 10 represented the exit level criterion.

Data Classification

Reading Recovery teachers are trained to analyze pupils' substitution responses according to seven categories of cue use: meaning (M), structure (S), visual (V), meaning and structure (MS), meaning and visual (MV), structure and visual (SV), and meaning, structure, and visual (MSV). An analysis of the running record identifies which cueing system(s) the child is attending to and provides a reliable, systematic way of identifying how the reader monitors and corrects performance while reading increasingly more difficult texts. Conventions for taking running records and the reliability and validity of the coding system have been established (Clay, 1979, 1985). Once trained, Reading Recovery teachers are continuously monitored to ensure accurate recording, coding, and analysis of errors.

Two researchers who were "blind" as to subject classification tallied the number of errors for each of the seven categories of cue use as recorded by the Reading Recovery teachers. In instances where no error was recorded, a zero was tallied. Two running records from levels 3 through 10 for the 60 subjects were classified. In 169 instances, only one running record was included in the analysis because the text reading was above 95%. A total of 791 running records were analyzed.

Design and data analysis

The study was repeated measures design. A between subjects variable of status (learning disabled or not learning disabled) and a within subjects variable testing level. Each student was tested at eight levels (3, 4, 5, 6, 7, 8, 9, and 10) with a composite being formed for levels 3, 4, and 5, which formed an entry level score and a composite formed for levels 8, 9, and 10 as an exit level score. Thus, the within subjects variable was treated as being measured at 2 levels (each being a composite score).

The entry level was defined as the combined records at levels 3, 4, and 5. Pilot study results (Lyons, 1987) revealed that at these levels beginning readers' initial strategies and preferred source of cue(s) are most evident. The effect of instruction on the error patterns begins to surface around levels 6 and 7 and is most likely to be established at approximately levels 8, 9, and 10 (Lyons, 1987). Therefore the exit level was defined as the combined records at levels 8, 9, and 10. Seven dependent variables were scored at each level: (1) meaning (M); (2) structure (S); (3) visual (V); (4) meaning and structure (MS); (5) meaning and visual (MV); (6) structure and visual (SV); and (7) meaning, structure, and visual (MSV).

Descriptive data for State of Ohio Reading Recovery program is presented in Tables 1 and 2. Frequencies, means and standard deviations are presented for two groups of Reading Recovery children, learning disabled and not learning disabled at entry composite levels (3, 4, and 5).

TABLE 1

Frequencies, Means and Standard Deviations
for Learning Disabled and Not Learning Disabled Children
on Seven Cueing Systems: Entry Composite (levels 3, 4, 5)

	Learning Disabled			Not Learning Disabled		
Measure	N	Mean	SD	N	Mean	SD
Meaning	30	4.067	5.502	30	2.900	3.782
Structure	30	1.233	1.794	30	1.267	1.911
Visual	30	5.833	4.526	30	.733	1.507
Meaning/ Structure	30	5.900	7.208	30	7.333	7.141
Meaning/ Visual	30	.867	1.502	30	.533	1.167
Structure/ Visual	30	.667	1.749	30	.833	2.183
Meaning/ Structure/ Visual	30	1.467	2.285	30	3.433	3.857

Frequencies, means and standard deviations for two groups of Reading Recovery children, Learning Disabled and Not Learning Disabled, at exit composite levels (8, 9, and 10) are presented in Table 2.

TABLE 2

Frequencies, Means and Standard Deviations
for Learning Disabled and Not Learning Disabled Children
on Seven Cueing Systems: Exit Composite (levels 8, 9, 10)

	Learning Disabled			Not Learning Disabled		
Measure	N	Mean	SD	N	Mean	SD
Meaning	30	2.300	4.372	30	2.300	2.938
Structure	30	1.633	3.469	30	1.667	2.721
Visual	30	4.500	5.342	30	4.033	4.287
Meaning/ Structure	30	5.500	6.580	30	6.033	7.308
Meaning/ Visual	30	1.000	1.339	30	.967	1.884
Structure/ Visual	30	1.000	1.414	30	.833	1.367
Meaning/ Structure/ Visual	30	4.567	4.125	30	6.500	3.803

The error pattern responses of "learning disabled" children were compared with error patterns of the other group. Significance of the difference between the mean scores of the groups was determined by a multivariate repeated measures analysis.

Results

The overall multivariate F was significant ($p < .05$) and univariate analysis of variance were completed for each variable. Significant results were obtained for visual ($p < .001$) and meaning, structure, and visual (MSV) measures ($p < .007$). See Table 3.

TABLE 3

Analysis of Student Scoring
Degrees of Freedom, Sum of Squares, and F Value of
60 Reading Recovery Children on 7 Dependent Measures

Dependent Variable=Meaning			
Source	DF	SS	F-Value
Status	1	10.21	.40
Level	1	42.01	4.032*
Status by Level	1	10.21	.98
Error	58	1003.40	

Dependent Variable =Structure			
Source	DF	SS	F-Value
Status	1	.03	.003
Level	1	4.80	1.12
Status by Level	1	.00	1.00
Error	58	252.3	

Dependent Variable=Visual			
Source	DF	SS	F-Value
Status	1	232.41	13.01**
Level	1	29.10	1.71
Status by Level	1	161.01	9.49**
Error	58	1710.08	

Dependent Variable=Meaning/Structure			
Source	DF	SS	F-Value
Status	1	29.01	.36
Level	1	21.68	1.15
Status by Level	1	6.08	.32
Error	58	4600.41	

TABLE 3 (continued)

Dependent Variable=Meaning/Visual

Source	DF	SS	F-Value
Status	1	1.01	.39
Level	1	2.41	1.29
Status by Level	1	.68	.36
Error	58	85.01	

Dependent Variable=Structure/Visual

Source	DF	SS	F-Value
Status	1	.00	1.00
Level	1	.83	.28
Status by Level	1	.83	.28
Error	58	83.33	

Dependent Variable=Meaning/Structure/Visual

Source	DF	SS	F-Value
Status	1	114.08	7.80**
Level	1	285.21	.00
Status by Level	1	.01	.00075
Error	58	1912.01	

Multivariate Test

Source	F-Value	F-Probability
Status	2.55	.025
Level	4.34	.001
Status by Level	1.66	.140
Error	51.24	

*P < .05
**P < .01

Closer examination of the mean scores for each dependent measure (see Table 1) shows that the main differences between groups are at the entry levels for the two dependent variables which showed significant differences on the univariate analysis of variance; visual (V) and meaning/structure/visual (MSV). The "learning disabled" group are more

likely to attend to visual information (mean 5.833) compared to the not "learning disabled" group who rely solely on visual information less often (mean .733). The not "learning disabled" group are more likely to use multiple sources (MSV) of information (mean 3.433) compared with the "learning disabled" group's use of multiple sources (mean 1.467) at the entry levels.

Between group differences are evident for the other five dependent measures at the entry level, the greatest difference being the not "learning disabled" group's use of meaning and structure (mean 7.33) compared to the "learning disabled" group's (mean 5.900) use of meaning and structure (MS). The differences, however, are not significant.

No between group significant differences are evident on any dependent measure at the exit levels (see Table 2). Close examination of the means on each exit measure reveals that the two groups have become more alike as they progress through the Reading Recovery program. Both groups are more flexible in the way they integrate information from all cueing systems. Of the 30 "learning disabled" Reading Recovery children, 22 were discontinued (reached average reading levels in their respective classrooms) in an average of 82.63 lessons, compared to 21 of the not "learning disabled" group who reached average reading levels in 63.13 lessons.

Conclusions

1. It appears that it is possible to determine the categories of cue use children develop by analyzing oral reading error patterns.
2. How groups of children approach beginning reading instruction is influenced significantly by the class instruction.
3. There are significant differences between what least able readers who

are further classified as "learning disabled" initially attend to in learning to read compared to other failing readers who are not classified as "learning disabled."

4. The two groups of at risk readers begin the Reading Recovery program from different places having different points of view about reading; the two groups become more alike as they progress through the program, leaving Reading Recovery with similar points of view.

5. The integrated strategies "learning disabled" children acquire are determined to a significant degree by the instruction received in the Reading Recovery program.

Discussion

Identification of cue use categories

The attempt to identify the categories of cue use children develop by analyzing error patterns was successful. Classification on the bases of cue(s) use appears to be a good indicator of the reading instruction the least able readers have prior to entry into the Reading Recovery program. The findings suggest that the response patterns of the two groups of Reading Recovery children ("learning disabled" and not "learning disabled") are representative of most members within the group rather than a function of the distinctive patterns of a few.

Influence of method on the way least able readers attempt to read

Most reading research that examines beginning reading instruction focuses on the effect of instruction on groups by studying posttest scores, in other words, the product. This study, like Barr's (1974) examines the process of learning to read by examining strategies and error behavior of beginning readers from entry to exit from a program. The differences in error pattern behavior between "learning disabled" and not

"learning disabled" children at the beginning of the Reading Recovery program appear to be related to the type of beginning reading instruction each group receives and how each group initially attempts to learn to read. Since there are many beginning reading programs that emphasize phonics, it may be that what the "learning disabled" children learn, they learn too well. Marie Clay (1985) states:

> An even greater problem is that the child has not failed to learn in his three years at school, he has tried to do his work, he has practised his primitive skills and he has habituated, daily, wrong responses. He has learned; and all that learning stands like a block wall between the remedial teacher and the responses that she is trying to get established. A remedial programme must take what has to be unlearned into account. (p. 11).

The shift of the "learning disabled" children's use to multiple cueing systems so that their reading error patterns of behavior are similar to the not "learning disabled" group at the end of the program, suggests the pover the Reading Reading Recovery program has to influence at risk children's reading behavior. The findings also suggest that the shift in reading behavior of the "learning disabled" group occurs at levels 8, 9, and 10 and is representative of most members within the group rather than a function of one child.

Summary

The nature of beginning reading instruction does appear to influence reading behaviors of the least able readers, who are further classified as

"learning disabled." Two groups of at risk readers enter the Reading Recovery program at different points: (1) "learning disabled" children relying on visual information and ignoring or excluding supportive language; and (2) not "learning disabled" children who integrate the meaning and structure of language as well as the visual features of print in order to read. The two groups of children became more alike as they progress through the Reading Recovery program. Both groups increase in competence, with a large percentage reading with the average reading group in their respective first grade classrooms. There are no significant differences between the oral reading error patterns of the two groups at the time of exit. This study supports Clay's (1987) argument that children learn to be learning disabled.

This study provides evidence that a child's learning disability is environmentally produced and can be altered. Furthermore, the data indicate that the children in this study are not LD but ID, instructionally disabled. The Reading Recovery approach offers a promising way to undo this instructional disability.

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